WATER QUALITY

Beneficial Use Attainment

The Clean Water Commission of Missouri identifies livestock and wildlife watering, aquatic life protection, and fishing as beneficial water uses in all classified streams in the Pomme de Terre River watershed. Stream use classifications, according to the 1996 Missouri State Water Law (MDNR 1996) can be found in Table WQ01.

Water Quality Investigations

The Environmental Protection Agency (EPA) monitors water quality throughout the United States and compares the results to a national reference level developed for specific pollutants. Four conventional water quality indicators are routinely reported: ammonia, phosphorus, pH, and dissolved oxygen. Dissolved oxygen is an indicator of available oxygen within the system. The reference levels for these indicators are : ammonia = (recommended chronic levels for ammonia were taken from *Ambient Water Quality Criteria for Ammonia*, EPA 440/5-85-001, p.97 and vary considerably relative to temperature and pH), dissolved oxygen = 5.0 mg/L (in accedence if below this value), pH = 6.0 to 9.0 (in accedence if >9.0 or <6.0) and phosphorus = 0.1 mg/L. Out of 186 observations of phosphorus levels, 49 (26.3%) exceeded the criteria level, and out of 137 ammonia observations, 27 (19.7%) exceeded the criteria level. No observations in pH (n=1,134) or dissolved oxygen (57) exceeded the criteria levels. The EPA lists organic enrichment to be the most prevalent cause of river pollution in the Pomme de Terre watershed and municipal point sources to be the most prevalent source of river pollution.

Point Source Pollution

The Missouri Department of Natural Resources states that six sizeable wastewater discharges exist in the watershed (excluding discharges directly into Pomme de Terre Lake) (MDNR 1996) (Table WQ02). The Fair Grove discharge is within known distribution of Niangua darters. Niangua darters are a federally threatened fish species that are present in the watershed. Niangua darters and Niangua darter critical habitat and range are discussed in more detail in the Biotic Community and Habitat Conditions sections.

Known problem areas associated with municipal waste water treatment facilities (WWTF) include Lindley Creek seriously polluted for 4.5 miles downstream of the Buffalo WWTF discharge (Ryck 1973). The problems associated with the Buffalo WWTF were still evident in 1998 (John Ford, MDNR, pers. comm.). A report by MDC (MDC 1978) also listed this portion of Lindley Creek as being negatively impacted by excessive aquatic plant growth resulting in a reduction of aquatic life. As of March 1997 there were 54 NPDES facilities within the watershed (Figure WQ01). Table WQ03 gives a breakdown of the number of NPDES permits per subwatershed.

Fifty-four National Pollution Discharge Elimination System (NPDES) permits are currently active in the Watershed. Most of these permits are located in areas with higher human population densities. Sixty-five percent of the NPDES permits are located in the the Middle and Upper Pomme de Terre hydrologic units (Figure WQ01).

Non-point Source Pollution

Eutrophication is a problem in most Watershed streams as evidenced by the number that have heavy,

Figure WQ01. Location of permitted NPDES sites in the Pomme de Terre River watershed by treatment type.

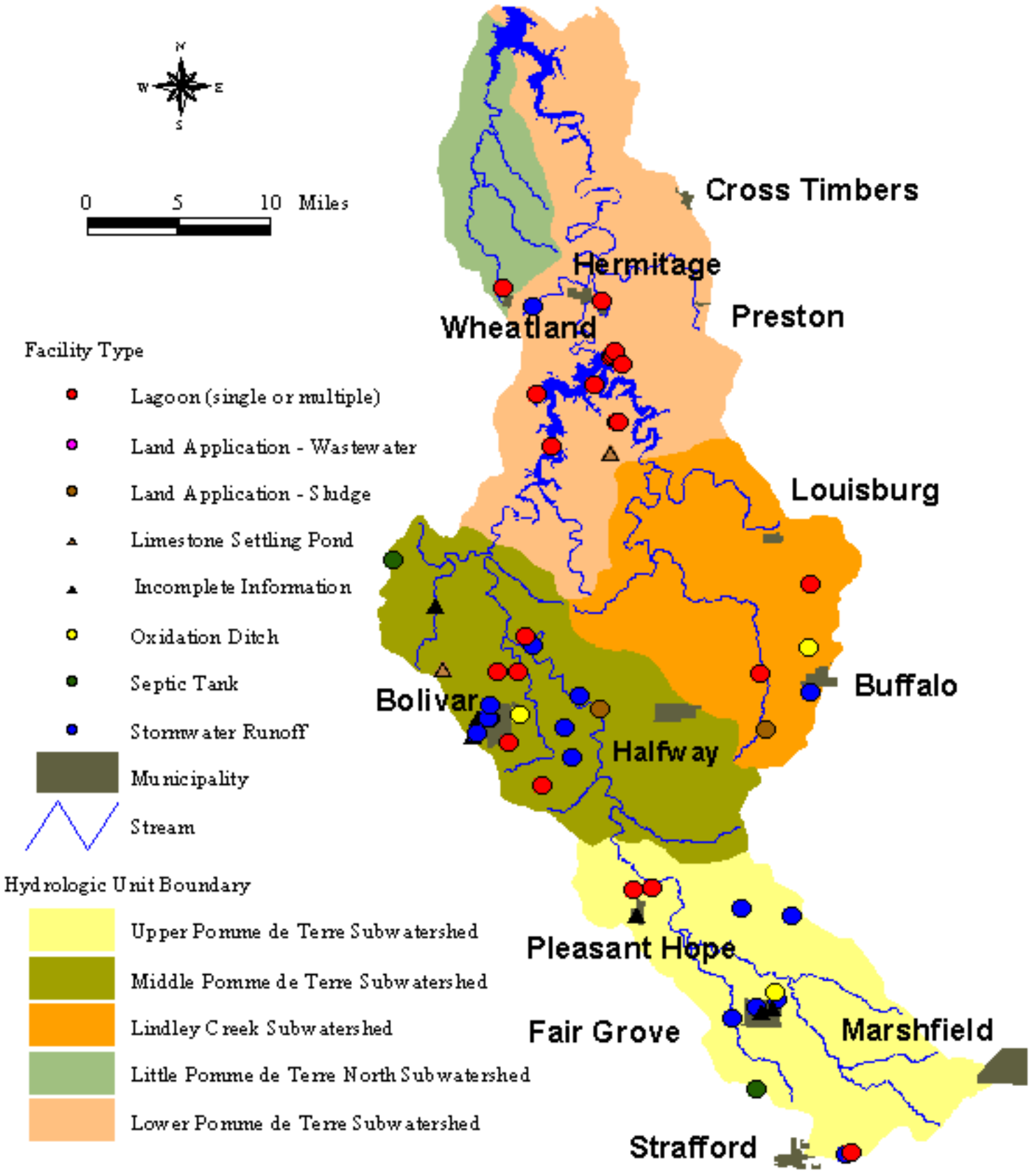

Table WQ01. Beneficial use designations for streams in the Pomme de Terre River watershed (MDNR 1996).

Waterbody	Mi.	From	To	County	Beneficial use
PDT	21.0	Mouth	PDT Dam	Hickory	ALL
PDT	62.0	35N 23W 24	30N 18W 07	Polk	LW,AL,CF,BC
Crane Creek	6.9	Mouth	36N 21W 04	Hickory	LW,AL
Crane Creek	3.4	36N 21W 04	36N 21W 12	Hickory	LW,AL
Trib. to Crane Creek	0.4	Mouth	36N 21W 01	Hickory	LW,AL
Trib. to Crane Creek	0.2	Mouth	36N 21W 01	Hickory	LW,AL
Trib. to Crane Creek	0.1	Mouth	37N 21W 32	Hickory	LW,AL
Trib. to Crane Creek	0.7	Mouth	37N 21W 29	Hickory	LW,AL
Trib. to Crane Creek	1.2	Mouth	37N 21W 34	Hickory	LW,AL
Trib. to Crane Creek	0.9	Mouth	36N 21W 14	Hickory	LW,AL
Trib. to Crane Creek	0.6	Mouth	36N 21W 14	Hickory	LW,AL
Davis Creek	2.5	Mouth	34N 22W 06	Polk	LW,AL
Deer Creek	4.0	Mouth	32N 21W 04	Polk	LW,AL
Dry Fork Creek	7.0	Mouth	34N 23W 08	Polk	LW,AL
Dry Fork Creek	1.0	34N 23W 08	34N 23W 08	Polk	LW,AL
Hominy Creek	12.5	Mouth	33N 21W 15	Polk	LW,AL
Ingalls Creek	6.2	Mouth	35N 21W 01	Hickory	LW,AL
Jordan Branch	1.0	Mouth	37N 22W 11	Hickory	LW,AL
Jordan Branch	2.0	Mouth	37N 22W 15	Hickory	LW,AL
Little Lindley Creek	3.0	Mouth	34N 20W 15	Dallas	LW,AL
Little Mill Creek	4.8	Mouth	38N 21W 33	Hickory	LW,AL
Trib. to Little Mill Creek	0.6	Mouth	38N 22W 24	Hickory	LW,AL
Little PDT (south)	6.0	Mouth	31N 21W 25	Polk	LW,AL
Little PDT (north)	14.9	Mouth	37N 23W 03	Benton	LW,AL,WC,BC

Little PDT (north)	**7.0**	**Mouth**	**38N 23W 22**	**Benton**	**ALL**
Trib. to Little PDT (n)	**1.6**	**Mouth**	**38N 22W 09**	**Benton**	**LW,AL**
Little Wilson Creek	**3.5**	**Mouth**	**32N 21W 25**	**Polk**	**LW,AL**
Little Wilson Creek	**2.0**	**32N 21W 25**	**32N 20W 32**	**Dallas**	**LW,AL**
Lindley Creek	**22.0**	**Mouth**	**34N 20W 20**	**Hickory**	**LW,AL**
Lindley Creek	**2.0**	**34N 20W 20**	**34N 20W 32**	**Dallas**	**LW,AL**
Trib. to Lindley Creek	**3.0**	**Mouth**	**35N 20E 34**	**Dallas**	
Mill Creek	**1.5**	**36N 18W 09**	**36N 18W 08**	**Dallas**	
Mill Creek	**6.2**	**Mouth**	**37N 21W 09**	**Hickory**	**LW,AL**
Mill Creek	**2.8**	**37N 21W 09**	**37N 21W 15**	**Hickory**	**LW,AL**
Trib. to Mill Creek	**0.3**	**Mouth**	**37N 21W 14**	**Hickory**	**LW,AL**
Trib. to Mill Creek	**0.8**	**Mouth**	**37N 21W 16**	**Hickory**	**LW,AL**
Montgomery Branch	**6.5**	**38N 23W 15**	**37N 22W 06**	**Hickory**	**LW,AL**
Mutton Hollow	**2.5**	**Mouth**	**31N 20W 13**	**Greene**	**LW,AL**
Piper Creek	**7.5**	**Mouth**	**Highway 83**	**Polk**	**LW,AL**
Trib. to PDT	**1.2**	**Mouth**	**36N 22W 30**	**Hickory**	**LW,AL**
South Fork PDT	**4.0**	**Mouth**	**30N 20W 25**	**Greene**	**LW,AL,WC,BC**
Schultz Creek	**5.0**	**Mouth**	**32N 21W 10**	**Polk**	**LW,AL**
Self Branch	**1.0**	**Mouth**	**31N 20W 15**	**Greene**	**LW,AL**
Stick Branch	**0.2**	**Mouth**	**36N 21W 21**	**Hickory**	**LW,AL**
Stinking Creek	**1.0**	**Mouth**	**35N 22W 22**	**Polk**	**LW,AL**
West Fork	**1.0**	**Mouth**	**34N 23W 07**	**Polk**	**LW,AL**

Beneficial uses: LW= livestock & wildlife watering; AL= protection of warm water aquatic life and human health-fish consumption; CF= cool water fishery; WC= whole body contact; BC= boating and canoeing.

Table WQ02. Municipal waste water treatment facilities in the Pomme de Terre River watershed, excluding those that discharge directly to Pomme de Terre Lake (MDNR 1996).

Facility Name	Receiving Stream	Discharge Amount Million Gallons per Day (MGD)	Known Impacts
Hermitage WWTF	PDT River	0.03	No known impacts
Unnamed WWTF	Crane Creek	minimal	Impacts not assessed
Bolivar WWTF	Town Branch and Piper Creek	1.3	Impacts up to 2 mi. of receiving streams
Buffalo WWTF	Little Lindley Creek	0.25	Serious impacts to 1 mi. unclassified stream and 0.5 mi. classified stream
Fair Grove WWTF	PDT River	0.1	Minor sludge, solids deposition
Pleasant Hope	PDT River tributary	0.01	

Table WQ03. Number of NPDES facilities in the Pomme de Terre River watershed, by HUC.

Subwatershed	Number of Facilities
Upper Pomme de Terre	15
Middle Pomme de Terre	20
Lindley Creek	5
Little Pomme de Terre North	1
Lower Pomme de Terre	13
TOTAL	54

thick filamentous algae concentrations. Most streams are being impacted by runoff from livestock grazing. Cattle have free access to streams in most cases. The MDNR (1994) stated that, "there has been a trend of increasing numbers of dairy cattle in the southern portion of the basin (Osage River Basin). Many of these dairies are not adequately managing animal wastes and it is running off into spring branches and streams," A major non-point source can be found just southeast of Bolivar where a new golf course is being built. Siltation has been a major problem in Piper Creek during construction of this golf course.

The largest decline in stream quality of the Pomme de Terre River between the highway D crossing and PP crossing occurs as a result of waters received from Piper Creek. In August 1996 water above the Piper Creek confluence was noticeably clearer compared to below the confluence where floating mats of algae could be seen and slack water areas had a surface film of "scummy algae." Field observations of Piper Creek confirmed this stream is being impacted by eutrophication. Suspected sources include point sources in the Bolivar area, golf course construction and fertilizer application, and cattle with free access to streams.

Fish Kills and Pollution Incidents

Several fish kills have been reported throughout the Watershed since the early 1970s (Table WQ04). One, a 1991 Pomme de Terre River fish kill in Webster County, occurred in the upper known range of the Niangua darter. Although no Niangua darters were reported killed, this exemplifies the potential threats not only to successful recovery of this threatened species, but to all aquatic biota inhabiting streams in the Watershed. Fish kills have been a problem in Pomme de Terre Lake in the 1990s.

Consumption Advisories

Fish consumption advisories are published annually by the Missouri Department of Health. The most recent (MDOH 1998) advisory states that all fish are safe to eat in any amount from lakes and streams in the Ozarks. This includes all streams and lakes in the Watershed.

Stream Teams

Missouri STREAM TEAMs are volunteers who help protect streams throughout the state. STREAM TEAMs are supported by MDC, MDNR, and the Conservation Federation of Missouri. There have been four STREAM TEAMs active in the watershed. Their efforts include litter clean-up, water chemistry and macroinvertebrate sampling, tree planting for bank stabilization, and stream inventories. The STREAM TEAM programs and citizen awareness about stream issues have been a growing and important facet of protection and enhancement of state waters. These organizations will continue to play ever important roles in future stream issues.

Table WQ04. Fish kills and pollution incidents in the Pomme de Terre River watershed, including Pomme de Terre Lake (MDC Fish kill reports, MDNR 1994 and 1989, and Ryck 1974).

Waterbody	County	Date	Known Extent	Cause	Number Killed
Pomme de Terre Lake	Hickory	05/11/98		Undetermined	300+
Pomme de Terre Lake	Hickory	07/97		Columnaris	no est.
Pomme de Terre Lake	Hickory	05/20/97		Protozoan	250
Pomme de Terre Lake	Hickory	11/96		Protozoan	no est.
Pomme de Terre River	Hickory	11/30/96	1 mi.	Undetermined	5
Pomme de Terre Lake	Hickory	01/29/96		Protozoan	7,000+
Pomme de Terre Lake	Hickory	Spring 95		Undetermined	95% of adult white bass
Pomme de Terre Lake	Hickory	10/07/94	7,820 acres	Parasite (protozoan)	1,000+
Pomme de Terre Lake	Hickory	09/24/94	7,820 acres	Disease	no est.
Pomme de Terre Lake	Hickory	09/24/94	1.4 mi.	Protozoan	1,880+
Piper Creek	Polk		0.5 mi.	Suspended solids from Bolivar WWTF	
Little Lindley Creek	Dallas		1.0 mi.	Sewage from Buffalo WWTF	
Trib. to Little Wilson Creek	Dallas	10/28/93		Diesel fuel	

Jordan Branch	Hickory			Sediment	
Pomme de Terre River	Polk	02/21/93		Oil	
Pomme de Terre River	Webster	08/14/91		Agriculture, low D.O.	495
Crane Creek	Hickory	01/13/89		Tanning & other waste	
Trib. to Mile Branch	Polk	01/26/80		Gasoline	
Pomme de Terre River	Hickory	07/07/78		Crude oil	
Pomme de Terre River	Webster	05/17/78		Magnesium alloy	
Lindley Creek	Dallas	00/00/71	0.5 mi.	Municipal waste	
Lindley Creek	Dallas	00/00/71	1.0 mi.	Municipal waste	
Wilson Creek	Greene	00/00/71	5.2 mi.	Municipal pollution	
Wilson Creek	Greene	00/00/71	7.4 mi.	Industrial pollution	